Bob Cooper's

APRIL 15 1995

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific Ocean Region

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and now
in English!

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Playing The Programming Game

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✓Latest satellite operations
✓Latest SPACE Pacific news
✓and EMTV Schedule

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COOP'S COMMENT

April 15, 1995

On March 9th media mogul Rupert Murdoch expanded his web of international satellite and cable programming ownership by announcing a partnership with Australian Telecom (Telstra). The two firms combine to equal FOXTEL with ambitious plans to expend A$3.9B building a monster coaxial and fibre optic cable network that is projected to pass by 4 million Australian homes.

Less noticed in the hype following the announcement was a lesser announcement; Telecom and Murdoch's News Media Corporation are investing A$71.4 million into Australis / Galaxy and acquiring just over an 8% interest each in the Optus distributed pay television service.

By early April, Galaxy's Optus B1 service (transponders 10 and 11H in the high power beam) were distributing as many as 10 programme channels to terrestrial microwave transmitters (MDS) serving Melbourne and Sydney. On the ground, Galaxy subscribers are charged A$299 for installation and A$49.95 per month for subscription; each receiving a small microwave (dish-like) antenna, and microwave 'downconverter'. The present channel line-up being transmitted by Galaxy, using General Instrument Digicipher 1 (digital and encrypted) technology, includes:

Showtime (a US premium movie service transmitted to Australia on PAS-2)
Encore (a US 60s-70s-80s release movie service, also via PAS-2)
Premier Sports Network (fed from satellite links to the world)
TV1 (not NZ's TV1 but rather a teen-age children aimed service)
Documentary Channel (using films largely from the ABC archives)
Music Video (the title says it all)
CNBC (strangely, not the PAS-2 service but rather the I180E feed)
New World TV (a mixture of CTN, TVB [Chinese] and Vietnamese)
TeleItalia

Galaxy's Optus 'bandwidth' has room for 32 digital programmes; more are on the way. And none of this, today, is available to home dish viewers. Murdoch's people say the roll out of Galaxy home dish service is delayed pending manufacture of new IRD units; September is now a target date. We'll preview where Galaxy is headed and its impact on our trade in the May 15th issue of SatFACTS.

In Volume 1 ◆ Number 8

Departments

-ON THE COVER-
Jason Jones (Telsat Communications) assembling Orbitron 3.7m for commercial system user of ATN and EM TV from Rimsat G2

SURPRISE: Small Dish Signals!

RIMSAT G1 + G2 ARE LOADED

Only one year ago the RIMSAT family of satellites were something of a joke; an insider's joke. Coop's Technology Digest for May 1994 wrote:

"Here is a group of people named Sternberg and Habib operating out of offices in Naperville, Illinois (and the Philippines) who are leasing Russian satellites and parking them in orbital spots claimed by the 'Kingdom of Tonga'. And in their only successful operation to date, RIMSAT has leased television transponder time to a renegade Indian subcontinent telecaster who is originating his programmes in a hut outside of Moscow and sending them back to the Indian Ocean on a slightly less than space-worthy Russian satellite.

"Should a would-be user of satellite transponder space take these guys seriously?"

In less than ten months, we now have all 12 C-band transponders on both Rimsat G1 (130E) and G2 (142.5E) occupied by paying customers. Rimsat, the company, is now in the midst of (US) Chapter 11 proceedings; voluntary reorganisation in lieu of bankruptcy. The company is being run by a US Court Order under the direction of a court appointed manager while a tangled trail of dealings woven by Rimsat's founder Dr. Mats Nilson is untangled. Nilson conceptualised Rimsat, created the framework for use of Kingdom of Tonga orbital parking spots, and engineering the design and lease of Russian Gorizont class satellites for the firm. Along the way there were internal squabbles between stockholders; a battle that escalated as Rimsat suddenly cracked the Indian cable TV marketplace. No, Rimsat is not in danger of going under; Chapter 11 proceedings are the result of internal stockholder battles, not a shortage of cash. Mats Nilson, ex-Comsat management, is now ex-Rimsat as well.

Despite of the internal problems, Rimsat's past 12 month period has been one of rapid growth; so much growth that plans for the G3 satellite (scheduled for 70E later this year) do not rule out a G4 bird within a year (Rimsat holds, through Tonga, orbital spots of 83E, 140, 134 and 142.5; 134 is presently in use by AsiaSat 1 but the terms of this arrangement have never been announced.)

The Indian cable TV marketplace is explosive; as many as 700 new cable TV systems are reported on a weekly basis! PanAmSat's PAS-4 satellite, to go to 72E in mid year, will serve the region (including 12 just announced Ku transponders boresighted on India for small dish DTH service). A Russian Express satellite has just been leased by GE Americom (formerly RCA) to be parked at 80E and four of its six C band transponders have been pre-sold to a group calling itself Business India TV. Russia, itself, operates suitable orbital spots at 145E, 140, 103, 99, 96, 90, 85 and 80(E). They plan new satellites (totally new or newer replacements) for 140E (see 'With The Observers', SF #7, p.22) and other unspecified Pacific-Indian Ocean locations. The Russian satellite operators are active themselves 'selling' transponder space on their many Pacific and Indian region satellites. A service calling itself ANPA ("Our TV") is due to begin broadcasting in five Indian dialects from 140E today (April 15; see 'With The Observers', this issue, p.22).

And then of course there are the major players: Asiasat 1 with AsiaSat 2 replacement due on line by September, an eventual replacement for lost-at-launch ApStar 2, and the new Palapas (C1 due at 113E in November, followed by C2M in 1996) plus the new JCSAT3 (128E in August).

The Indian cable and satellite TV business press believes there will be a need within two years for not fewer than 100 separate programming channels via satellite into the country. If that number seems large, consider that India has 5 widely spoken languages plus more than 200 lesser dialects and ultimately each will require their own service channel(s). In fact, 100 satellite channels beaming into India could be on the low side of the real need.

RIMSAT: There First

Rimsat's present customer load, on 12 C-band transponders (6 each G1 and G2) is virtually all intended for India; or at least to viewers who speak one of the many dialects native to the country. Dr. Nilson had arranged with the Russian satellite designers to configure the C-band downlink footprints (coverage area) for G1 and G2 to cover all of the bases. At the time the satellites were being designed (1992-93) not even

Nilson foresaw the increase in Indian cable TV firms. And, he was forecasting which portions of Asia might require Rimsat services. On both G1 and G2 he took the lowest transponder number (centred on 3675 MHz; Russian R6, to the rest of the world 1 minus) and reserved it for Global coverage. On most satellites, global beam means the available power is spread thinly over approximately 40% of the earth's surface below and that in turn means not very much power arrives at any single location. The effect of this is that while a large region is 'covered,' most of the users will require sizeable receive antennas.

Dr. Nilson had an answer for this 'thin' global coverage problem encountered by others; his R6 transponder would operate with high power; 75 watts. How powerful is that? It works out to around 49 dBw at spot-beam boresight which at C-band means you could take an LNB with a feedhorn attached and point the feedhorn at the satellite and receive pictures; without a dish at all! Not great pictures, but watchable pictures.

So TR R6 (minus 1) on G1 and G2 both are endowed with this coverage ability. This explains why RAJ-TV, on TR R6 from 130E is noisefree from Perth to New Zealand (and beyond) on dishes that are 2m in size and smaller.

"*130-TR6 is actually leased to Reuters TV of London who sublease it to RAJ TV*" notes Rimsat's VP of Sales and Marketing Tim Brewer. He continues, "*Actually, Mr. Rajendrum is on our 'hot transponder' by pure luck as the zone beam transponder that he was scheduled to go on was not available.*"

Zone beam?

After global beam coverage, Dr. Nilson tried to create coverage beams for the 5 remaining transponders which would be most marketable: Reach the areas on the ground where the most possible people (users) might be located, weighed against the regions of the world where customers were likely to develop. Rimsats have:

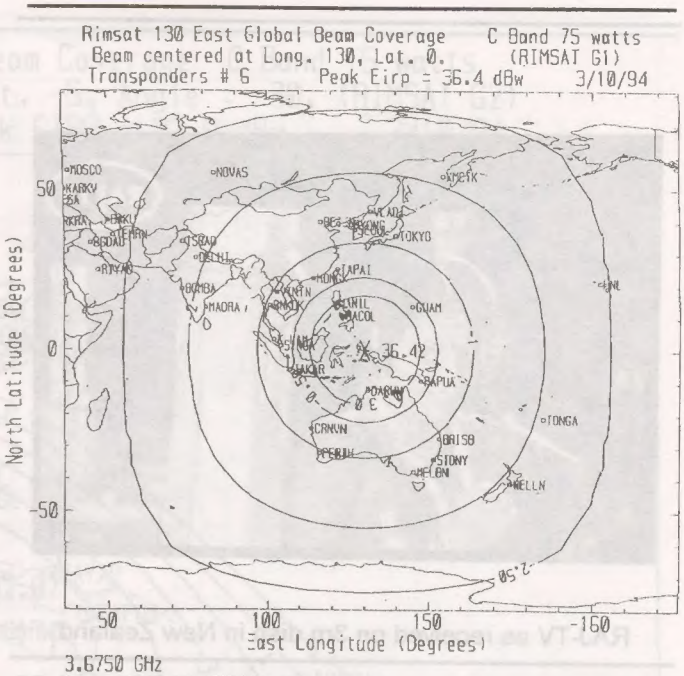
a) High powered Global Beam coverage (1 transponder per satellite);

b) High powered Spot Beam (option pattern for the R6 high powered transponder)

c) Lower powered Global beam (15 watts versus 75 watts of the high powered transponder)

d) Zone beam, 3 transponders as an optional to global

e) Hemispheric (hemi) beam



RAJ-TV on 3675 from 130E (G1): Centre of pattern (boresight) level is 36.4 dBw (1.2m dish for 7 dB C/NR). Sydney is -1.1 dB or 35.3 dBw. NZ is -2 dB or 34.4 dBw.

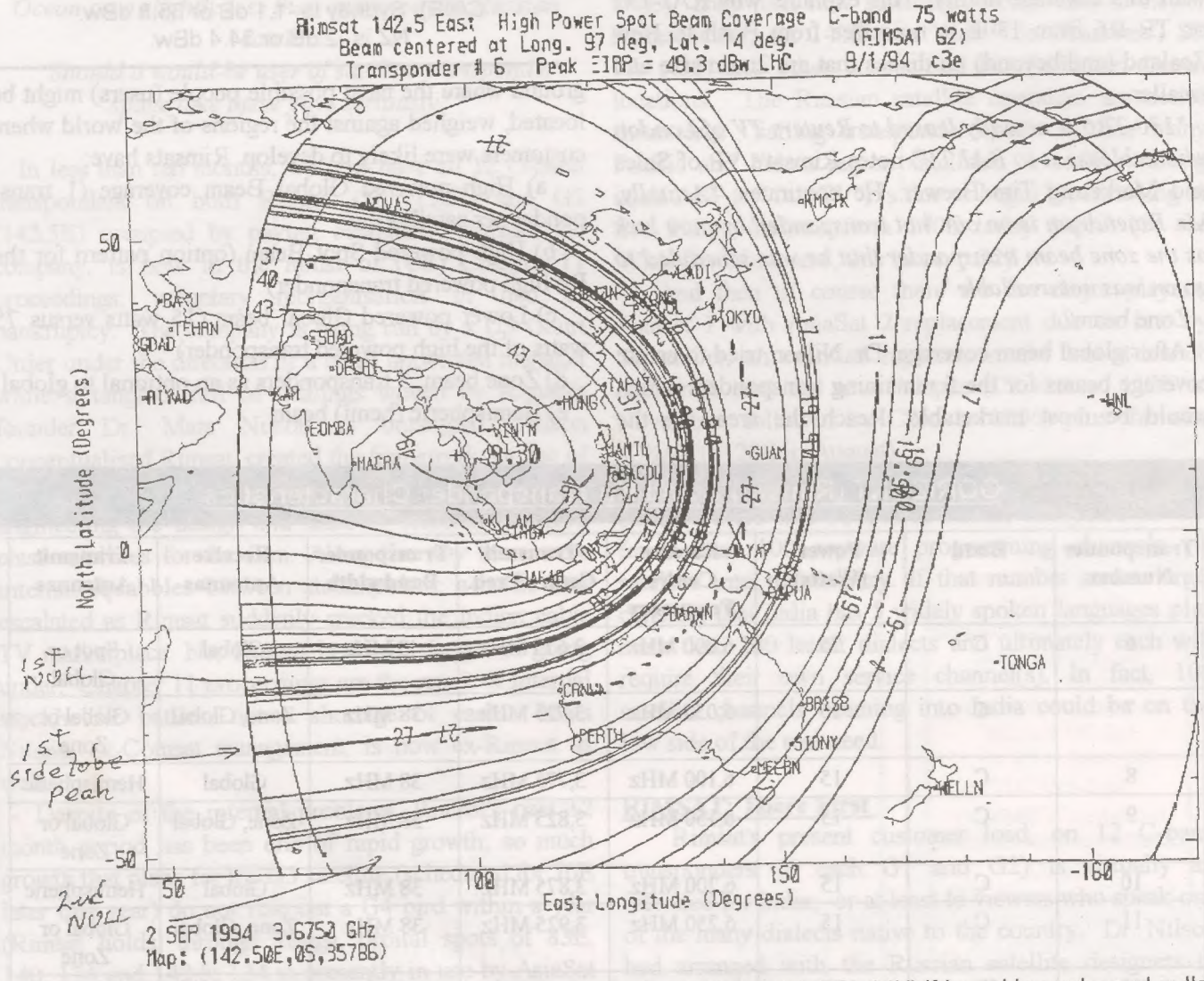
GORIZONT (Rimsat) C and Ku Transponder Characteristics

Transponder Number	Band	Power (Watts)	Receive Centre Frequency	Transmit Centre Freq.	Transponder Bandwidth	Receive Antennas	Transmit Antennas
6	C	75	6,000 MHz	3,675 MHz	40 MHz	Global	Spot or Global
7	C	15	6,050 MHz	3,725 MHz	38 MHz	Zone, Global	Global or Zone
8	C	15	6,100 MHz	3,775 MHz	38 MHz	Global	Hemispheric
9	C	15	6,150 MHz	3,825 MHz	38 MHz	Zone, Global	Global or Zone
10	C	15	6,200 MHz	3,875 MHz	38 MHz	Global	Hemispheric
11	C	15	6,250 MHz	3,925 MHz	38 MHz	Zone, Global	Global or Zone
12	Ku	20	14,325 MHz	11,525 MHz	38 MHz	Spot	Spot

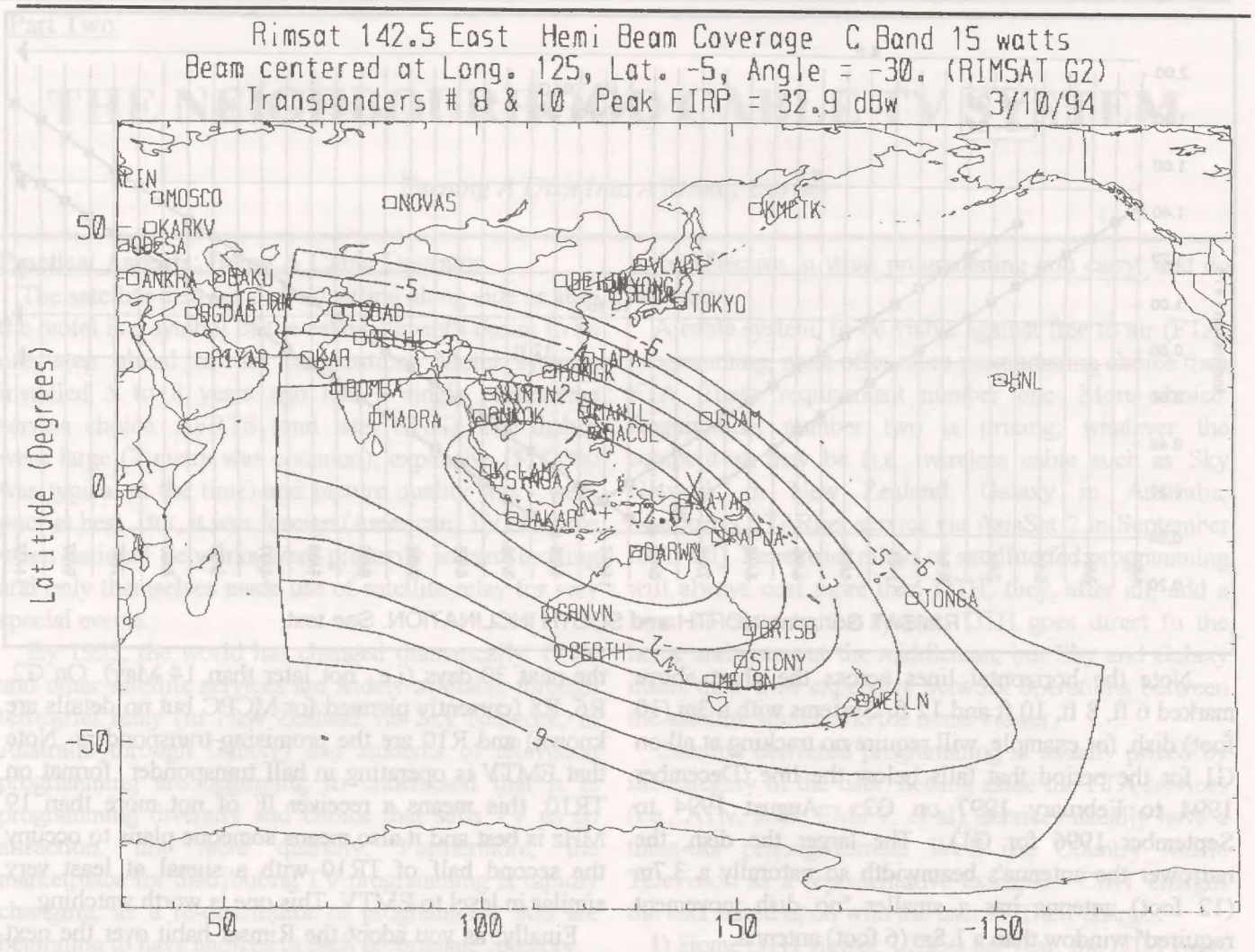
RAJ-TV as received on 3m dish in New Zealand

A table here shows the possibilities for G1 and G2. The satellite operator determines whether a beam shall be spot or global, global or zone as applies to each transponder.

Note that R6 can be either global or spot. As you might imagine, when a 75 watt transponder is narrowly focused into a spot (narrow beamwidth) very large signal levels occur on the ground. However, it is normal for a tightly focused beam to also have surrounding rings (called 'sidelobes') away from the spot focus where the signal level is either way up (called a 'peak') or way down (called a 'null'). With sidelobes, the signal is enhanced in the region of a peak and will be from 3 to 6 dB stronger as a result of the peak than it would be without this 'fringing effect'. Note on the map for G2 here (ATN coverage, provided with notations by Tim Brewster of Rimsat) how the first null runs counter clockwise through western Indonesia, the first peak runs through Australia north of Perth (but through Darwin) while the second null crosses through central Australia. East coast Australia falls into the 2nd peak and New Zealand is probably in the third peak.



ATN (TR R6) from 142.5E coverage pattern; note how spot beam focus (at 97E, 14N) 'fringes' in peaks and nulls

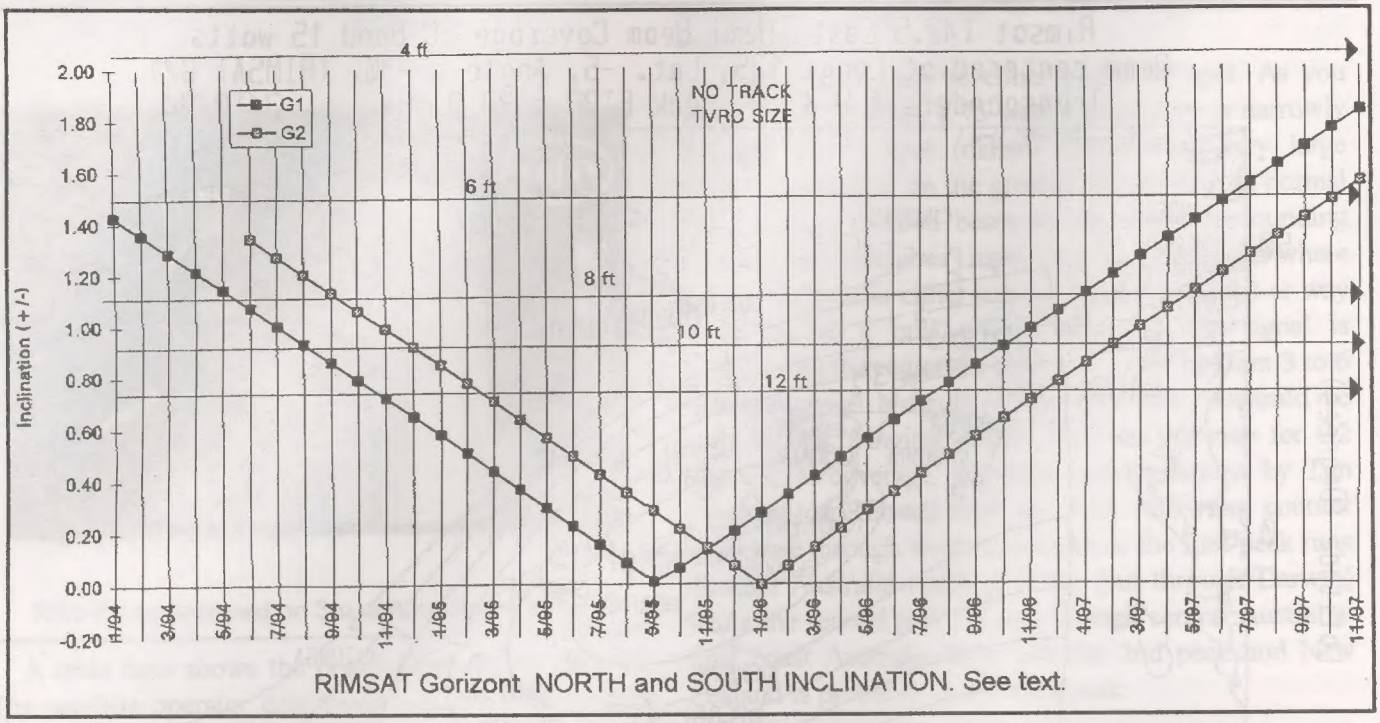


RIMSAT 142.5E (G2) Hemi Coverage Pattern: EMTV is on this pattern in 1/2 transponder format

The hemispheric pattern depends upon the satellite's orbital location. In the map here, for 142.5E, TRs 8, and 10 are running in the hemi mode. The boresight signal is 32.9 dBw and falls at 125E, 5S. Most of the Australian eastern, southern, western coasts are from 2 to 3dB lower than boresight (i.e., 30+ dBw region) and this translates to 7 dB C/NRs on dishes of 1.8m size. In New Zealand, 28.5 dBw (3m size), in Tonga 27.5 dBw (3.7m dish). This is of some immediate importance given the appearance of Australia's Channel 9 EMTV 'offshore service' on TR10 of 142.5 on March 30 (see programme schedule notes, page 23 this issue). Note that the hemi beam pattern on G1 (130E; not shown here) is totally different; Brisbane, for example, is 30.9 dBw on G2 but only 23 dBw from G1 (130E). Thus G2, for our south Pacific region, has far more interesting possibilities.

Finally there is the zone beam; transponders 7, 9 and 11 on both G1 and G2 (also not shown here). This is the least favourable pattern of all for the region south of the equator; G1 and G2 are both zone beam boresighted at 38 dBw on 110E, 15N. In the case of G1, Darwin is already down to 26 dBw while on G2 Darwin is down to 28 dBw; the 'difference' being the two locations of 130 and 142.5E. Signal levels in Perth, Sydney and Wellington are in the 8m and up class for even 5 dB C/NR pictures; not good. We extrapolate all of this in the table at the bottom of page 6, here.

Russian Gorizont satellites are known to be inclined from birth whereas Intelsats only begin to move in a figure 8 (inclined orbit) pattern as their station keeping hydrazine fuel runs low (typically 7+ years after launch). What is not well known is that Gorizonts have a 'negative' (declining) amount of inclined orbit motion after launch, reaching a minimum of movement (no apparent movement at all) 17 to 18 months after launch. Both G1 (launched January 1994) and G2 (launched June 1994) have a smaller and smaller inclined orbit movement with each passing month. In mid-April, G1 is moving +/- 0.35 degrees while G2 moves +/- 0.65 degrees. In August of this year, G1 will be dead over the equator and not moving while in January 1996 G2 will be totally stable. We show this on the chart appearing at the top of page 6.



RIMSAT Gorizont NORTH and SOUTH INCLINATION. See text.

Note the horizontal lines across the chart above marked 6 ft, 8 ft, 10 ft and 12 ft. Systems with a 3m (10 foot) dish, for example, will require no tracking at all on G1 for the period that falls below the line (December 1994 to February 1997 on G2; August 1994 to September 1996 for G1). The larger the dish, the narrower the antenna's beamwidth so naturally a 3.7m (12 foot) antenna has a smaller "no dish movement required" window than a 1.8m (6 foot) antenna.

For the South Pacific, G1 transponder R6 is the one to watch with 3m and smaller dishes. Here, RAJ-TV is scheduled to increase to 18 hours per day sometime in the next 30 days (i.e., not later than 14 May). On G2, R6, R8 (currently planned for MCPC but no details are known) and R10 are the promising transponders. Note that EMTV is operating in half transponder format on TR10; this means a receiver IF of not more than 19 MHz is best and it also means someone plans to occupy the second half of TR10 with a signal at least very similar in level to EMTV. This one is worth watching.

Finally, as you adopt the Rimsat habit over the next few weeks, remember that Gorizont at 140E is promising new high power activity on at least TR R6 at anytime. There is more excitement just ahead!

G1 Trans./ Format	G1 Service/ Language	Sydney/ Welling. Lvl	Sydney/ Dish Minimum	Wellington/ Dish Minimum	Operating Hours UTC	Notes
R6/PAL	RAJ-TV/Tamil	35/34 dBw	1.2m	2.1m	1200-1800	High Power
R7/PAL	Sun TV/Tamil	20/19 dBw	7m	8m	0630-1800	Zone
R8/NTSC	ABC-5/English	23/22 dBw	5m	6m	0100-1600	Hemi
R9/PAL	AsNt/Malayal'm	20/19 dBw	7m	8m	0500-1800	Zone
R10/PAL	Gemini/Telugu	23/22 dBw	5m	6m	1300-1530	Hemi
R11/PAL	Mony/Hin-Tam	20/19 dBw	7m	8m	1300-1530	Zone

G2 Trans. Format	G2 Service	Sydney/ Welling. Lvl	Sydney/Dish Minimum	Wellington/ Dish Minimum	Operating Hours UTC	Notes
R6/PAL	ATN/Hindi	32 /31dBw	2.1m	2.5m	24 hours	Spot (ridging)
R7/PAL	JJAY/Tamil	20/19 dBw	7m	8m	Unknown	Zone
R8/S-A	Celcom/MCPC	32/28 dBw	2.1m	3m+	Not Operational	Hemi
R9/PAL	Eagle/Tamil	20/19 dBw	7m	8m	Unknown	Zone
R10/PAL	EMTV/English	32/28 dBw	2.1m	3m+	20-23;05-1400	Hemi
R11/PAL	Udaya/Kannada	20/19 dBw	7m	8m	0800-1900	Zone

Note: G2, TR R6 is 1/2 transponder, IF 1487.5; TR R10 is 1/2, IF 1265 MHz.

Part Two

THE NEIGHBOURHOOD CABLE TV SYSTEM

Turning A Dish Into A Money Earner

Practical Aspects: Being A Cable Operator

The satellite dish (or dishes) sitting along side or atop the motel is a symbol of the establishment's desire to be one step ahead of the competition. Motel systems installed 5 to 8 years ago had a single programme service choice: AFRTS (and later CNN). The dishes were large (7 metre was common), expensive ($18,000 was typical at the time) and picture quality was - well, poor at best. But, it was foreign (American) TV at a time when national networks were primarily inward looking and only themselves made use of satellite relay for very special events.

By 1995, the world has changed dramatically. CNN and other satellite services are widely available through terrestrial relay (in New Zealand via Sky Network, in Australia through Galaxy) and students of television programming are beginning to understand that it is programming diversity and choice that sells TV as an attraction, not mere quantity. Furthermore, the marketplace for distributing TV programming is rapidly changing; as a re-distributor of programming you are beginning to have choices in each programme category.

In New Zealand, for example, CNN was here first (through direct satellite and Sky relay) and was first established. But now there are other choices; the BBC World is one of those and more are just around the corner. Since March 19th, BBC World is being carried in bits and chunks by New Zealand terrestrial broadcasters. And the public relations departments of TVNZ are doing their best to pre-sell the importance of their new BBC World service to the non-tuners-in. Using the printed press to push their BBC World product, a TVNZ backer wrote in the New Zealand Herald (28 March):

"(BBC World) *programmes of such quality are rarely seen on free-to-air television in New Zealand, or on CNN or Sky's Discovery Channel.*"

As a builder, operator and owner of a small neighbourhood cable TV system, your work only begins when the system is constructed and functioning. Your lifeblood is cash flow, created by selling TV programming, and the pump that makes it work will be the programming you have chosen to carry on your cable system. Until 1995 you had few choices; from this point forward you will have many choices and you won't need them all to be a viable business. You can actually afford to be selective in what programming you carry, and do not carry.

A cable system, to be viable against free to air (FTA) programming, must offer more programming choice than FTA. That's requirement number one: More choice. Requirement number two is pricing; whatever the competition may be (i.e., wireless cable such as Sky Network in New Zealand, Galaxy in Australia, Murdoch's STARnet service via AsiaSat 2 in September for DTH). Terrestrial relays of satellite fed programming will always cost more than DTH; they, after all, add a layer of costs to the system. DTH goes direct to the home and cuts out the middleman, but Sky and Galaxy insert their own expensive network operations between the satellite source and the home viewer.

Satellite delivered programming is usually priced by the category of the user. Setting aside the FTA services (i.e., ATN, RAJ, EMTV, et al), services usually have a three-tier pricing format. We'll use Country Music Television as a representative example. CMT charges the user based upon who the user is. Their charges:

1) Home DTH viewer: US$50 per year, the DTH viewer must purchase their own IRD receiver (presently US$1,445 and up).

2) Motel/hotel (SMATV) systems, as well as condominium and other MATV/SMATV systems: US$25 per month ($300 per year) for each unit (TV outlet).

3) Cable television systems: US$0.30 per subscriber per month.

As you can see, there is a serious disincentive for motels and SMATV systems to take the service. There is also a serious incentive for a motel to 'fib' about its use of the service, to pretend it is a single home DTH customer (at US$50 per year). Other services have similar approaches to the marketplace although perhaps their rate differences between SMATV and CATV are not quite as dramatic.

Why this rate differential? A fair question.

A service such as CMT is unique in the marketplace; even in the USA (where a home DTH viewer presently has a choice between 540 different TV programme channels!), they have no serious competition. When you have the only (country music video) ball game in town, you have greater latitude in setting rates. That's their advantage.

But they are operating under several disadvantages. First is distance; the firm is headquartered in Connecticut and must try to manage their offering by remote control. On first inspection it might not look as though it requires much managing. Their US distributed signal, which is simultaneously distributed to Europe as well as the Pacific, is taken 'down' (received by satellite) at the PanAmSat Sylmar, California uplink site. There it is transferred to the PAS-2 uplink signal as a part (1 part in 6) of the Scientific Atlanta provided digital television MCPC (multiple channel per carrier) service on transponder 1V. At that point the signal is in digital format and is available throughout the Pacific wherever PAS-2 reaches.

Within the transponder 1V format on PAS-2 there is presently 'space' for six separate video programming channels; CMT is one of these. PanAmSat has, in effect, sold to CMT 1/6th of a transponder, full-time (24 hours per day). From the CMT perspective, it is being distributed throughout the PAS-2 coverage region for something approximating 1/6th the cost of what it would have to pay to rent transponder spectrum for an analogue CMT service.

That seems like an advantage. At this point in time it may not be.

To receive the CMT service the viewer must purchase a Scientific Atlanta (D9222) IRD (integrated receiver descrambler); US$1,445 or more. Once the receiver is installed at the CMT viewer's site, it must then be 'authorised' by electronic signal through the satellite. And it must be re-authorised (or de-authorised) monthly, to reflect the current payment status of the viewer. This is where the costs can really mount.

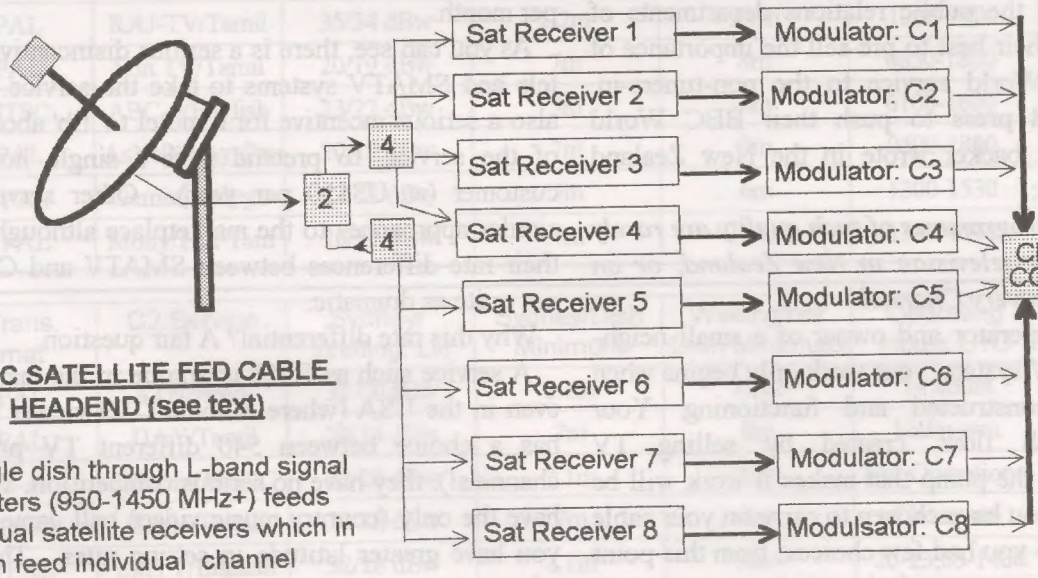
It takes just as much computer time and subscriber management to authorise or de-authorise an IRD for a single home (or motel) as it does to perform the same function for a cable TV system. The bureaucracy required to keep track of each subscriber, to verify the current payment status of each subscriber, is just as great for the single home as it is for the cable system.

CMT tries to improve this situation by requiring DTH (home) subscribers to pay for their service annually, in advance. In this way they are able to "manage" (monitor and re-authorise or de-authorise) each IRD unit only once every 12 months. Motels and SMATV systems are required to pay no less often than once every 3 months. The cable system client can pay monthly (provided he has a minimum subscriber count) on the theory that cable system subscriber numbers change monthly (usually upward each month, which translates to more money for CMT with each billing period).

Even a small, neighbourhood cable TV system operator will not be immune to, nor can he ignore, the practical management required for his system after construction. Programming choices, based upon the perception of audience appeal and the practicalities of dealing with each programming source will play a continuing role in the system's management requirements.

The Starting Point

While our emphasis to this point has been with the motel operator as a logical starting point for a 'neighbourhood cable system' (see SF no. 7, p.'s. 5-8), in actual fact even a private home with a satellite dish and a desire to turn the dish installation into a profit centre will qualify. As noted in part one of this series, the



BASIC SATELLITE FED CABLE HEADEND (see text)

A single dish through L-band signal splitters (950-1450 MHz+) feeds individual satellite receivers which in turn feed individual channel modulators to combiner

motel makes particular sense as a starting point because the cable system will allow the operator to replace the present (Sky Network in New Zealand) 'pay TV' outlay with what will always be a lower cost per month programming package taken directly from satellite; not through a middleman such as Sky. And the money saved, by not purchasing pay TV through a middleman, become a part of the cash flow for the cable system itself.

How will you distribute the programming? Coaxial cable is the mechanical answer. But, how will you route the cable out of your own property to the property of your potential subscribers?

Laws (and regulations) will vary greatly within the 22 countries where this is being read; in the least regulated areas, you will simply string your cable overhead (attaching to existing utility poles), bury your cable underground (along a roadside or sidewalk), or run it from house to tree to fence post in the best (and suitably safe) method available to you. No permits required; just do it.

In the worst case scenario you will do this only after working your way through various levels of government bureaucracy for the permission you need to run your cables. In the United States, municipal bodies (a town board, a city council) grant 'franchises' for this purpose and the franchise is in reality their legal permission for the cable company to suspend (overhead) or bury its coaxial cable lines (amplifiers, attachments) within the 'public right of way'. US law is not our model in the Pacific; but there is always some board or agency that must approve your cable installation before you begin.

Here, New Zealand law is quite unique and what follows may not apply to you in Tuvalu or the Solomons.

1) The Law says that if you will serve fewer than 500 people with your cable system, you just go ahead and do it (after obtaining local district council approval to use the rights of way or public easements to run your cables).

2) The Law also says that if you will serve more than 500 people, you have the option (but not the requirement) to apply to the Ministry of Commerce for something called Network Operator Status (NOS). With NOS, you acquire the legal right to use public easements and rights of way and in fact you cannot be denied access to these areas with your cables. You also acquire, with the same abilities as a power company or telephone company, the right to cross over or through private lands as well with your cable lines; even if the private landowner objects to your doing so.

Network Operator Status requires a submission to the Ministry of Commerce and the entire process, from initial application to granting of your status (assuming you are deemed to qualify) requires approximately 90 days time. Note that NOS is optional, is not required but may be a useful instrument to obtain the legal right to string or bury cables if either individual land owners or local authorities are not co-operative in granting you their permission to run your cables. Under the procedures of NOS, your cable company operates with the same legal rights as the largest telephone or power utility firms; if your cable needs to cross a piece of property, permission to do so cannot be denied.

In New Zealand, the next hurdle is the Resource Management Act. It provides that any activity which holds the potential of 'endangering the environment' must have approval in advance of occurring. An obvious example would include a new plastic production firm that seeks to build on the edge of a stream and dump potential toxins into the stream. A new cable TV 'wire' strung overhead between existing utility poles falls into the same 'permission before installation' category as the plastics plant as it could hold the potential for 'visual pollution' of the skyscape. A cable TV system installed below ground (buried) also requires resource management approval but this is usually a less controversial situation than overhead wires. Most (New Zealand) District Councils have someone who is the 'Senior Planner - Resource Management Division' and that is where you begin your investigation of this aspect of system planning and construction.

How 'Small' Can Be Profitable?

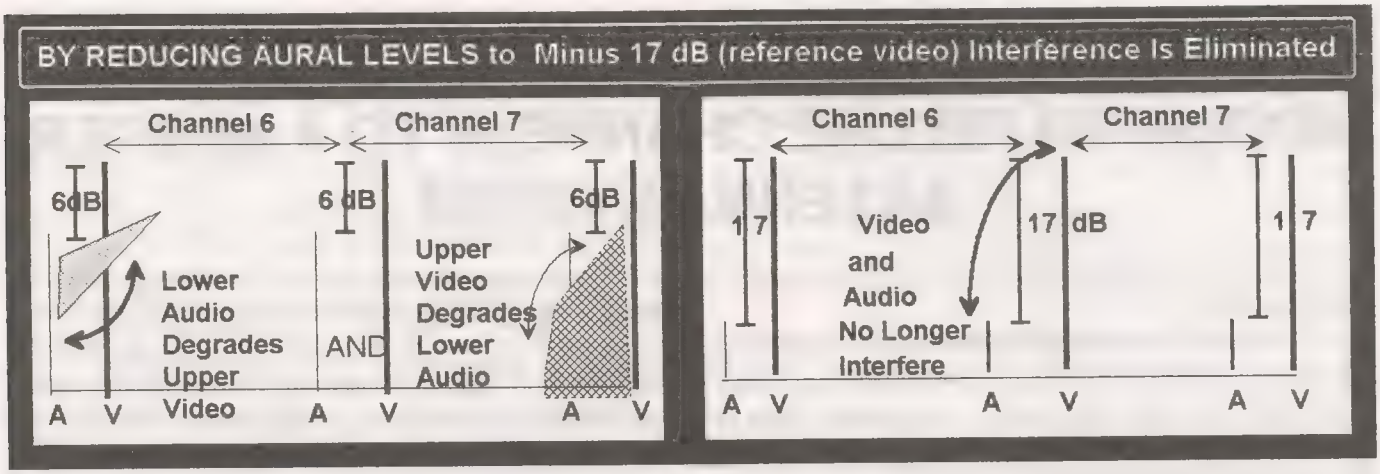
Two factors affect the equation:

1) The number of cable channels you will process at your headend (signal processing facility), and,

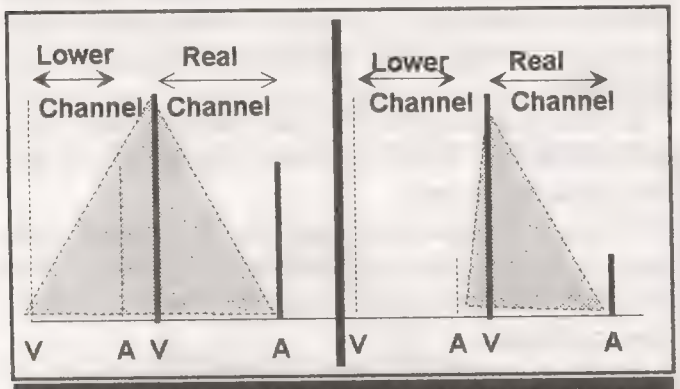
2) The density of the housing (potential subscribers) nearby to your headend.

Each headend processed channel requires equipment; at the very least, a satellite receiver dedicated to a single programme source and a modulator to recreate the programming on a normal TV channel frequency of your choice. We cost that separately here. Note that one satellite dish can (and will) receive as many separate programme channels from a single satellite as you require. Each satellite 'source' will require its own dedicated dish to which (through signal splitters) you have as many dedicated receivers plugged in as you have programme channels.

Individual receivers (whether old-fashioned analogue or the newer IRD digital models) process the incoming signal to 'baseband video and audio'; pure video and pure audio of the same sort as you would connect to the 'A/V' inputs on a TV monitor / receiver. The audio and video from the receiver is in turn connected to a channel modulator which now creates a standard (PAL) TV signal that can be tuned in on a specific TV set channel.



Low cost modulators are known in the trade as 'Double Sideband Modulators' (DSB), so called because no filtering is included to eliminate the unwanted and not needed 'lower sideband' portions of the signal. A TV set requires only a single sideband (the 'upper') to recreate images but eliminating the lower sideband can double the cost of the modulator. However, by leaving the lower sideband in place, this unwanted energy spills into the lower adjacent channel. Net result: You use one channel (say 7) but lose another one (6) as well with a DSB modulator. By using DSB modulators, you are giving up possible use of any lower adjacent channels. Note on the bottom of page 11 that consecutively numbered channels are not always adjacent in frequency: New Zealand 1 and 2, for example, have a non-TV piece of spectrum between them while Australian 0 and 1, 2 and 3, 3 and 4, 5 and 5A, 5A and 6 plus 9 and 10 all have non-TV spectrum space between them. From an interference point of view, DSB modulators can be used on non-adjacent channels without major problems without problems.



Double sideband (DSB) modulator (left) spreads video energy down into lower adjacent channel. Vestigial sideband (VSB) modulator (right) keeps energy inside single channel, eliminates lower channel interference.

But there is another consideration as well; the interference capability in the upper adjacent direction from the lower channel's audio signal. Most terrestrial transmitters reduce the aural (audio) signal by between 6 and 10 dB, reference its own video carrier. You can measure this with a signal level meter (SLM) on local channels in your area. This dates back to 1940 and 50s tests that indicated TV sets could recover (produce) good audio even when the aural carrier was reduced in power from the companion video carrier. By the 1960s cable TV systems were rediscovering that even at -17dB (aural carrier reduced in level by 17 dB from the companion video carrier), the TV sets produced fine audio. And by operating cable systems with the audio reduced by 15 to 17 dB reference the companion video, cable systems were able to eliminate 'sound bar' interference on the upper adjacent channel.

What resulted were cable 'channel processors' for off-air TV signals (i.e., receiving channel 5 off air, and placing it on channel 5 for cable carriage) and cable-design modulators. Both headend 'processor' types employ lower sideband video carrier filtering (called Vestigial Sideband or VSB) to ensure there is no video signal spillover into the immediately adjacent lower channel, and, adjustable aural carrier level controls to ensure the sound portion does not 'break into' the upper adjacent channel. With these tools, true adjacent channel, interference free, cable (MATV) system operation was possible.

There was a third element as well; signal level balance. To be absolutely certain that adjacent channels

do not interfere with one another, cable systems (whether MATV or CATV) 'balance' the channels at the headend. A full discussion of balancing will wait until next month but suffice to say at this point that adjacent channels are maintained typically within 0.5 dB of one another as measured at the headend output point. For example, the visual carrier for band III channels might look like this on a typical system:

Channel 5: +98 dBuV
Channel 6: +98.5 dBuV
Channel 7: +99 dBuV
Channel 8: +99.5 dBuV
Channel 9: +100 dBuV
Channel 10: +100.5 dBuV
Channel 11: +101 dBuV

If the signals exit the headend (signal processing area) 'balanced' they will (should) arrive at each TV set connected to the system with the same balance. And this ensures that the individual TV sets are able to cope with the multiplicity of channels without interference between channels.

'Extra Channels'

The chart appearing at the bottom of page 11 shows four different 'channelling plans'. At the top, the so-called European Plan which is found in one form or another throughout the continent. Not all countries still employ the band I (channels 2,3 and 4) spectrum for TV but most (other than the UK) do use the band 3 channels (5 through 12).

Australian channels are unique in the world and include telecasting spectrum in portions of the VHF band which no other country uses. New Zealand channels closely resemble the original European (UK) allocations of the early 50s.

Channels were originally allocated between 45 and 230 MHz by taking into consideration the pre-existence of other radio spectrum users (two-way radio, radio navigation aids, FM broadcast) as well as planned uses. TV was a part of a general plan and the overriding concern was spectrum efficiency; getting the largest number of often non-compatible users into the available megahertz without creating interference between services that would reduce the usefulness of the VHF band.

The 45 - 230 MHz portion of the spectrum is an 'open circuit' and signals do not respect national boundaries, often traversing great distances. The cable TV designers did not have this design problem since their use of the spectrum is confined to the inside of their coaxial cables. Thus they could create their own 'cable spectrum' without regard to border crossing distant signals causing interference. The European 'cable spectrum' appears at the bottom of page 11.

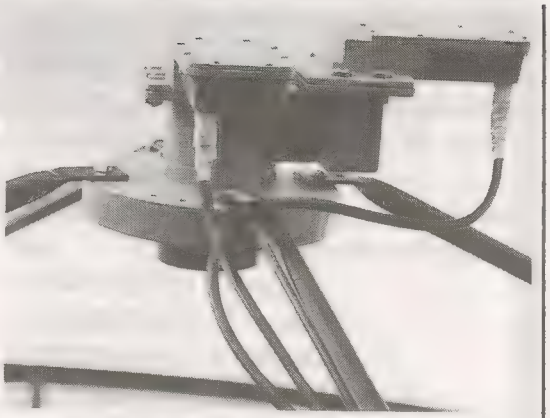
A PAL-B TV signal is 7 megahertz (MHz) in width. Thus every 7 MHz you can add another TV carrier if you wish; i.e., 48, 55, 62, 69 and so on. As long as your 'spectrum environment' is totally confined to the coaxial cable, how others use the same spectrum outside of your cable is only of passing interest.

Cable has created what they call the 'S Channels' with S1 starting at 105.25 MHz, S2 at 112.25 and so on up through S10 (168.25) which then folds into the band III channels (E5, A6, NZ4) at 175.25 MHz. After passing through the normal band III channels, the S channels renew with S11 at 231.25. This continues to S41 at 463.25 MHz in nice, neat, 7 MHz steps.

Band 1, S and band III channels meld together to form a complete cable spectrum that begins at 48.25 MHz (E2; this is the still in use European channel 2). Between E2 (48.25) and S11 (231.25) there is room for 24 PAL-B TV channels each 7 MHz wide. This plan skips over some spectrum space within band II (near to and within the FM broadcast band) out of respect that locally strong FM band signals (in Europe 66-72, 84-105 MHz) can 'leak into' cable systems and create terrestrial to cable interference.

Of course many (read "most" if not of 1994-1995 design) TV sets imported into the Pacific do not easily (if at all) tune these 'S' channels directly. This presents a motel SMATV system with another decision if use of the S channels is contemplated; how do you tune them in? The answers are: **(1)** Replace the TV sets with new cable tuning versions, or, **(2)** Use cable set-top converters. We'll start there in May.

the SATELLITE novice: Connectors



Don't Do This! Find out why ... here.

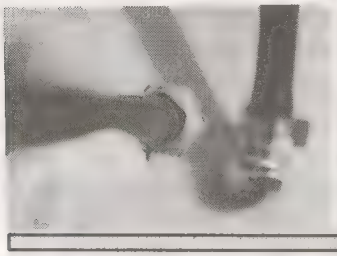
No person, nor firm, has ever taken credit for the creation of the ubiquitous 'F' fitting. Equipment advertised for sale as early as 1949 includes photos and claims of a very similar fitting (LaPoint-Plascomold Corp., [Vee-DX] of Winsor Locks, Ct., USA). From the early 1950s, 'F' fittings have been the standard connector for master antenna and cable television in North America. MATV installers in Europe never adopted it, however, and a 1936 developed fitting by Belling Lee (UK) remains a favourite of installers.

Fittings seem innocent enough. They are not. Fittings should be weatherproof, mechanically solid so that wind and vibrations do not shake them apart, and most importantly fittings should never introduce new 'impedance' to the cable or fittings they are joining. The Belling Lee (also known as PAL plug) fails on each count. The F fitting fails primarily because it is difficult to make it weather (water) proof. Difficult, but not impossible.

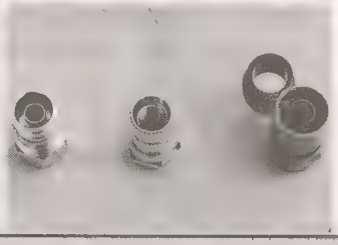
Our C and Ku band satellite signals travel to receivers at 'L' band; typically 950 to 1450 MHz. These are not frequencies that are accepting of low quality cable nor cable fittings. This is a frequency range that borders on microwave and a tiny droplet of moisture that appears inside of a fitting, or inside the rubberised protective jacket on cable can seriously degrade if not actually shut down the flow of satellite TV signals from the outdoor LNB to the indoor receiver.

The top (right) photo on this page shows a no-no. First, you can't see the fittings but they are a "crimp lock" type meant only for VHF use. Then the installer has wrapped the fitting in tape which he hoped will keep the moisture out. It will not. Humid air breathes

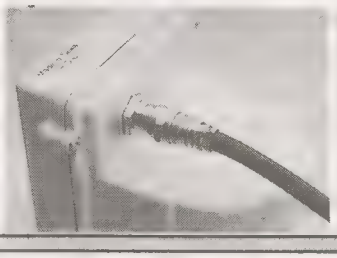
Unacceptable 'F' Fittings



3 Connector Types

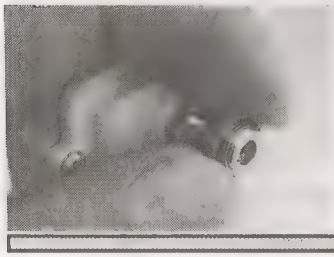


'Bad' Connector on LNB

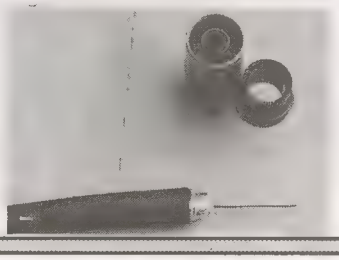


SNS6 On LNB

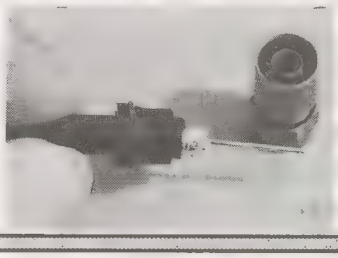
Weather Ring for SNS6



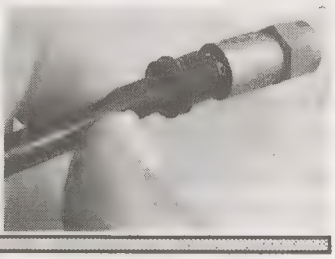
Install Parts - SNS6



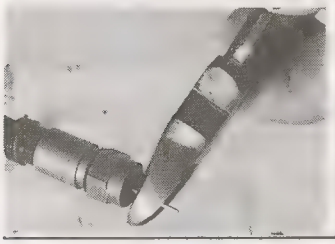
Weather Ring Installed



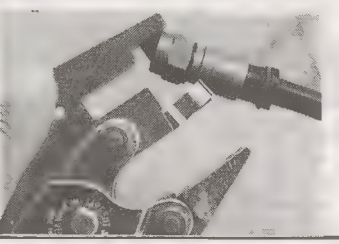
Connector Seated



Trim Centre Conductor

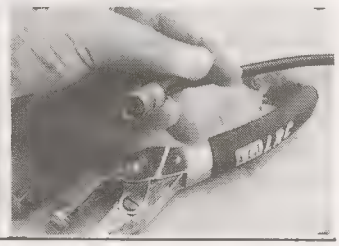


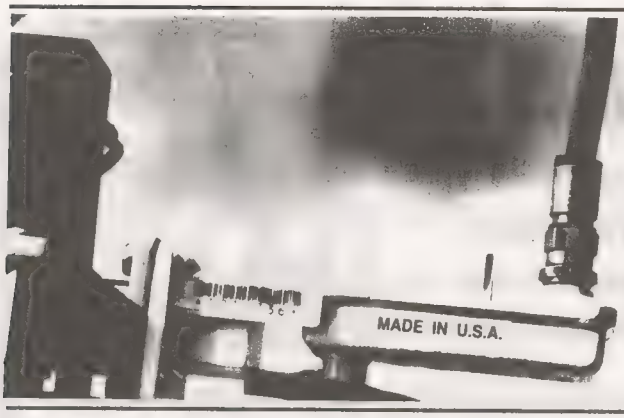
Position Sealing Tool

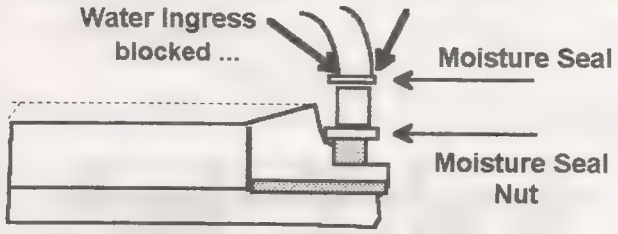


Torque Ring Into Fitting

Finished Connector







LRC Augat SNS6 Fitting seals both ends of RG6/U connector against moisture ingress

into the connector through the tape and condenses inside the fitting. Tape will not block moisture.

Fittings to prevent moisture must be designed for this feature on purpose. We show one of several types available (*) here; the LRC-Augat model SNS6. Unlike standard (good for VHF only) F fittings that have a crimp ring, the SNS6 has a snap-in rubber sealing ring (see photos of installation). Then for the LNB (et al) female connector end, a neoprene sealed screw-on ring that goes onto the female part before the male F fitting goes on. The two are drawn up tight together sealing the leading edge of the SNS6 against moisture ingress after the male part is tightened.

Poorly selected F fittings, improperly installed, are the number one cause of system degradation.

✓Never use all metal crimp-ring fittings for L band.

✓ Where practical, hang F fittings down so moisture runs away from, not towards the fitting.

✓ Always use fittings rated for 'L band' and in a very humid / wet area, seal externally with a self-curing Silicone caulk.

*/ John Laffey, Augat Pty. Ltd., Unit 3/1Vuko Place, Warriewood NSW 2102. Tel. 61-2-913-7100; Fax 61-2-913-7144. In New Zealand, Maser Technology Group (Ross Patterson), Tel. 64-9-479-7889.

A technical and marketing advisory

memo

to the membership from your industry trade association group

SPACE Pacific

Satellite
Programme
Access
Committ**E**e

A trade association for users, designers, installers, sellers of private TVRO systems in the POR.

April 15, 1995

MORE IRD Confusion

First a review.

At this point in time the following PAS-2 services are available in Scientific Atlanta MPEG 1+:

Transponder 1V: CMT

Transponder 2H: CTN (2 programme channels), CCTV and Asia Business News. TNT / Cartoons is expected here by June.

Transponder 9V: Prime Sports, Encore and Showtime as fed from USA to Galaxy/Australis (Foxtel).

If you acquire an S/A model D9222 IRD (integrated receiver decoder), set it up to receive the appropriate input (L band) channel, and turn it on it will say to you on the screen something similar to (or identical to) the photo below. This is the graphic you receive when you tune in to CMT by setting your D9222 to receive on 1406.5 MHz input, vertical polarisation from PAS-2.

Each programmer is establishing its own distribution and marketing system for the Pacific. SPACE Pacific has reached agreement with CMT to offer this service here; active negotiations are underway with others.

The D9222 has a distributor price (quoted in US dollars) which includes air freight of the unit from Ontario, Canada to your country's custom clearance location. The distributor in turn can be expected to mark-up the unit for his trouble in acquiring it for you, and if you are a satellite dealer you in turn will mark it up again before it ends up in the customer's hands. A retail customer price approaching US$2,500 is likely in this scenario.

The sequence works like this:

1) You, a dealer, obtain an order from your customer. You are well advised, after checking your dealer net pricing from your distributor, to collect in front for at least the D9222 IRD portion of the system.

2) You send an order (and payment) to your distributor. At the same time you contact SPACE Pacific with the name, address and telephone number of your customer. If this is a private home, you will (on behalf of your customer) complete some simple paperwork for SPACE and forward US$50 for a year's subscription in advance to CMT to SPACE.

3) SPACE advises CMT of the order (identifying your customer by name, address and telephone number) and sends a copy of this advisory to your distributor.

AN INVITATION TO JOIN **SPACE Pacific**

There is a category of membership for virtually every reader of SatFACTS; each membership class carries distinct privileges. A **SPACE** Membership explanation package is available at no charge and includes membership application forms. Classes are: Individual Member (for an individual owning a satellite dish for private viewing), Commercial Member (for motel/hotel [SMATV] and CATV users of satellite signals), System Retailer-Installer (for firms selling and installing home and commercial dish systems), and, Equipment Importer-Manufacturer - Distributor (including firms providing programming to the Pacific Ocean Region, via satellite). Each membership category has an advisory committee made up of members to formulate policy and objectives for possible **SPACE** Pacific implementation. To enquire, use card on page 26 this issue or fax **SPACE** at 64-9-406-1083.

4) Your distributor forwards his order to S/A along with a copy of the SPACE initiated customer order. S/A then checks with CMT to verify that the unit is going to a properly enrolled CMT subscriber.

5) S/A ships the unit (usually within 7 working days) via air freight to either your distributor or directly to you as a dealer.

6) You install the IRD and advise SPACE when it is operating and showing a screen message like that shown on page 16.

7) SPACE advises CMT the unit is functioning and ready to be 'hit' with authorisation codes. If all goes properly, within 24 hours of your advising SPACE the unit is installed and functioning without CMT, you will have CMT authorised and a happy customer.

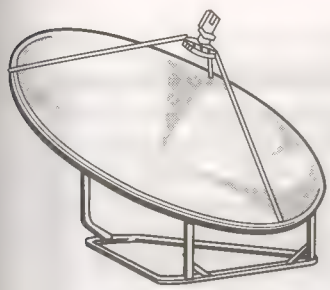
This format will be pretty much standard for all S/A encrypted services for probably the balance of this year. General Instrument (GI) encrypted services (presently only The Filipino Channel in Digicipher 1 on PAS-2, and temporarily, all ten of the Australis-Galaxy services on Optus B1) work much the same.

As awkward as this surely is, people are subscribing, D9222 IRDs are being flown into the South Pacific and with some minor problems they are being authorised. There is a substantial learning curve going on here and SatFACTS will explore what it is all about in detail in the May 15th SPACE Notes.

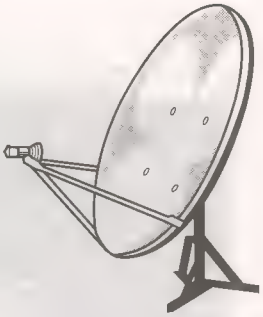
ORBITAL ACTIVITY - PRESENT AND SCHEDULED (Current to April 1995)

(Shaded indicates change at orbital position)

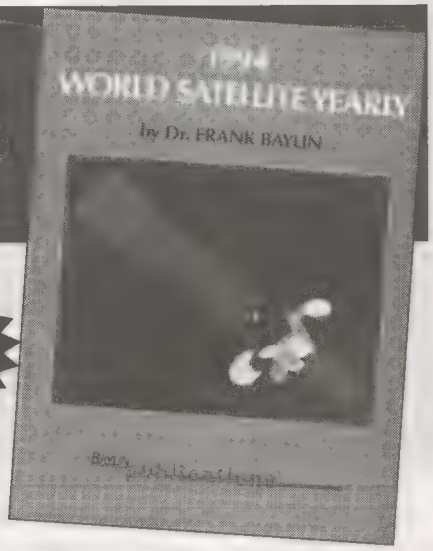
Orbit Pos.	Satellite	Inc. Orbit	Polarity	Dec. 1994	Mid 1995	End 1995	Mid 1996	End 1996
87.5E			Linear V,H				Apstar 2?	Apstar 2?
100.5E			Linear V,H		AsiaSat 2	AsiaSat 2	AsiaSat 2	AsiaSat 2
102.7E	Ghorizont 25	+/- 0.2	Left Hand Circular	Ghorizont 25	Ghorizont 25	Ghorizont 25	Ghorizont 25	Ghorizont 25
105.5E	AsiaSat 1		Linear V,H	AsiaSat 1	AsiaSat 1	AsiaSat 1	AsiaSat 1	?
107.7E	Palapa B2R		Linear V,H	Palapa B2R	Palapa B2R	Palapa B2R	Palapa B2R	Palapa B4
110.7E	ChinaSat 2		Linear V,H	ChinaSat 2	ChinaSat 2	ChinaSat 2	ChinaSat 2	ChinaSat 2
113.0E	Palapa B2P		Linear V,H	Palapa B2P	Palapa B2P	Palapa C1	Palapa C1	Palapa C2M
115.5E	ChinaSat 5		Linear V,H	ChinaSat 5	China DFH 3D	China DFH 3D	China DFH 3D	China DFH 3D
118.1E	Palapa B4		Linear V,H	Palapa B4	Palapa B4	Palapa B4	Palapa B4	Palapa C1
128.0E			Linear V,H		JCSAT 3	JCSAT 3	JCSAT 3	JCSAT 3
130.0E	Rimsat	+/- 2.2	LHC	Rimsat G1	Rimsat G1	Rimsat G1	Rimsat G1	Rimsat G1
131.8E	Japan CS3A		CP	CS3A	CS3A	CS3A	CS3A	CS3A
134.3E	Rimsat	+/- 3.6	LHC	Rimsat	Rimsat	Rimsat Express?	Rimsat Express?	Rimsat Express?
135.8E	Japan CS3B		LHC	CS3B	CS3B	NTT-1	NTT-1	NTT-1
138.0E	Apstar 1		Linear V,H	Apstar 1	Apstar 1	Apstar 1	?	?
139.9E	Ghorizont 18	+/- 0.2	LHC	Ghorizont 18	Ghorizont 18	Newer Ghorizont	Ghorizont	Express?
142.5E	Rimsat (2)	+/- 0.2	LHC	Rimsat G2	Rimsat G2	Rimsat G2	Rimsat G2	Rimsat G2
145.0E	Ghorizont	+/- 1.0	LHC	Ghorizont	Ghorizont	Ghorizont	Express11?	Express11?
154.0E								Palapa B2R
156.0E	Optus A3		Linear V,H	Optus A3	Optus A3	Optus A3	Optus A3	Optus A3
160.0E	Optus B1		Linear V,H	Optus B1	Optus B1	Optus B1	Optus B1	Optus B1
164.0E	Optus A2	+/- 1.3	Linear V,H	Optus A2	Optus A2	Optus B3	Optus B3	Optus B3
169.0E	PanAmSat PAS-2		Linear V,H	PAS-2	PAS-2	PAS-2	PAS-2	PAS-2
174.0E	Intelsat 701		CP, LP	I701	I701	I701	I701	I701
177.0E	Intelsat 703		CP,LP	I703	I703	I703	I703	I703
180.0E	Intelsat 511	+/- 2.0	CP,LP	I511	I511	I511	I70?	I70?
177.0E	Intelsat 510	+/- 2.2	CP,LP	I510	I510	I510	?	?



AV-COMM SATELLITE TV EQUIPMENT



1994 WORLD SATELLITE YEARLY



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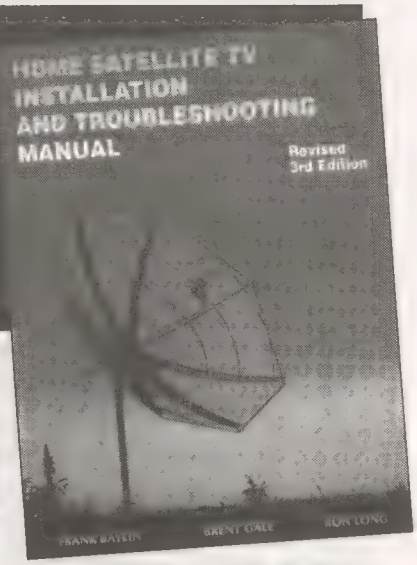

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WITH THE OBSERVERS

CARTOONS ARE COMING!
Turner's Cartoon Channel/TNT (classic movies) is scheduled to start programming week of April 16, most likely PAS-2 TR10 in 1/2 transponder format. Service will be PAL B-Mac encrypted shortly after launch. All Pacific subscriptions through Turner at Tel 61-2-957-5255, Fax 61-2-957-5161; details #9.

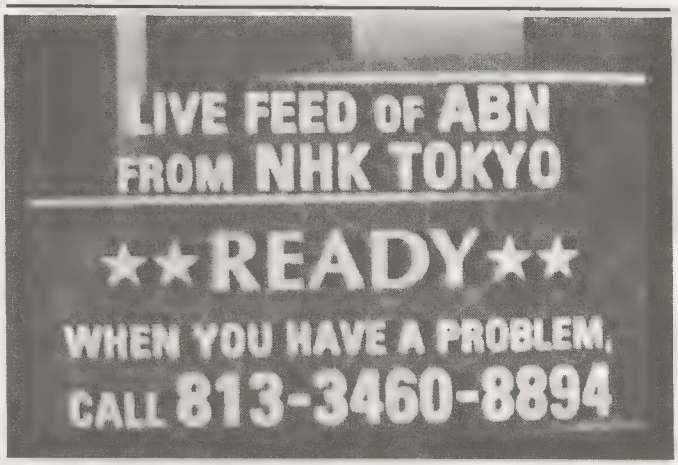
David Pemberton (Muswellbrook, NSW) appears to have been the earliest to have caught Papua New Guinea EMTV 'testing'; 25 March at 0100 UTC for an hour only. Although Geoff Kong at Media Niguini P/L (EMTV; Fax 67-5-254450) had promised testing from the 26th of March and programming from the 30th, there were apparently some hiccups along the way. Steffan Holzt (Studio 7, Noumea) also caught the tests early and many observers saw a blank (no video information) carrier on the correct 142.5E R10 channel during the 25-30 (and after) period. It turns out the test card seen by Pemberton and others was originated at the Subic Bay Rimsat uplink. The programming, however, was always planned to uplink directly from PNG to G2. As of the morning of 3 April, a technician at the New Guinea uplink advised CTD, "*We have experienced a failure in our motor drive for the uplink dish; parts are in transit and as soon as they arrive and are installed, we expect to be on G2.*" At 0557 NZT April 5 Tyrell Ruscoe reported EMTV operational. See schedule p.23.

Alek Zapara's 1.8m motorised dish produces P4 (P5 is perfect) pictures from RAJ-TV and Russian Statsionar 14 (96E), P5s from PanAmSat's C and Ku services at Perth. His receiver is a Winnersat WR916 with an S/A 9708 B-Mac decoder.

Ken Grady (Wheeler Heights, NSW) and many others now report a visible reduction in CNNI signal quality following their change to 1/2 transponder format (SF#7, p.22). There are two separate signals within TR10H, CNN centred at (IF) 1184 and CNN feeds at 1156. To best recover the individual services the receiver (IF) bandwidth should be around 20 MHz as wider bandwidths allow hash from the 2nd signal into the demodulator circuits, and, also bring noise from outside the programme channel width into the picture.

Solar noise outages were widely reported by observers between 30 March and 8 April. This phenomenon occurs twice each year for C-band (a minor problem at Ku) and is the result of the 'Sun' passing directly in line with the satellite heading (from your location). At C-band frequencies, the Sun is a very significant "noise generator" and what you see with a solar conjunction is the Sun's radio frequency noise being collected by your dish and focusing into the feed. This noise varies in strength during the 11 year solar cycle, but is always equal to or greater than the signals you receive from a typically less than 50 watt satellite transponder. During conjunction you can walk to your dish and actually see the shadow of the feed on the dish's surface, falling squarely onto the centre of your dish indicating there is a straight line from the dish's centre through the feed to the satellite, and, the Sun. Typical 'outages' last from 5 to 15 minutes and occur as a function of where you are located north or south of the equator. The March-April session just passed and the September conjunction coming calculate like this:

- 20 South: 28-31 March / 12-14 September
- 25 South: 31 March - 2 April / 10-12 September
- 30 South: 2 - 4 April / 8-10 September

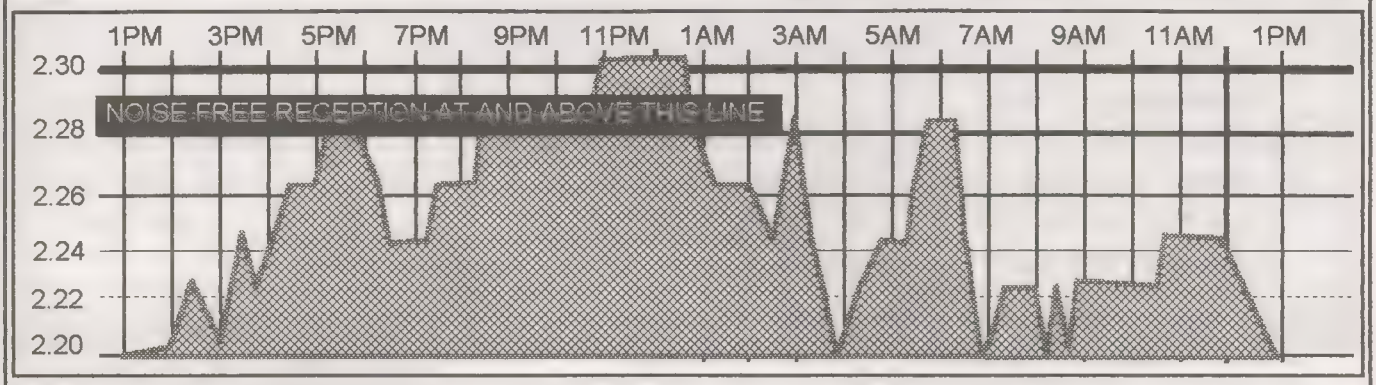


NHK feed to Asia Business News PAS-2, TR12H. ABN initiated PAS-2 digital service 24 March and specialises in "*timely, in-depth and relevant business news and financial information from Asia.*"

WITH THE OBSERVERS: Reports from Pacific Ocean Region (POR) satellite dish operators relating to reception, equipment changes, programming trends as reported to SatFACTS using our POR Observer reporting form on page 25 (this issue). Photos of satellite reception and equipment, personnel are invited. When snapping TV screen photos: Use ASA 100 film, set camera at 1/15th second for PAL/SECAM, 1/30th for NTSC with aperture of F3.5 to 4, camera on tripod or stand. Material submitted cannot be acknowledged except by publication; none will be returned. Material may be faxed (64-9-406-1083); note deadline on Observer card.

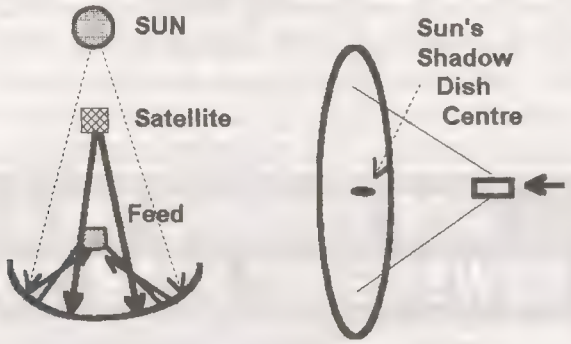
THE CHARTED WANDERINGS of OPTUS B3 as OBSERVED FROM NEW ZEALAND

Signal level measured at receiver AGC voltage point (3.7m dish), 30 January 1995, by Robin Colquhoun, Auckland (NZ time)



Optus engineering, not likely to be remembered in history for their veracity, insists Optus B1 is stable in the sky. They blame observed variations in signal level (as measured in New Zealand) as being "weather related." This TR7/lower (ABC) signal recording was made under totally clear skies over a 24 hour period. Subsequent recordings show the precise same pattern, clear or occluded skies present, but in a time cycle of approximately 24 hours 3 minutes. In other words, each day moves ahead by about 3 minutes time. The C/NR variation from 2.20 volts AGC to 2.28 volts AGC is approximately 4 dB.

- 35 South: 3-5 April / 6-8 September
- 40 South: 5-7 April / 4-6 September
- 45 South: 6-8 April / 3-5 September
- 50 South: 7-9 April / 2-4 September



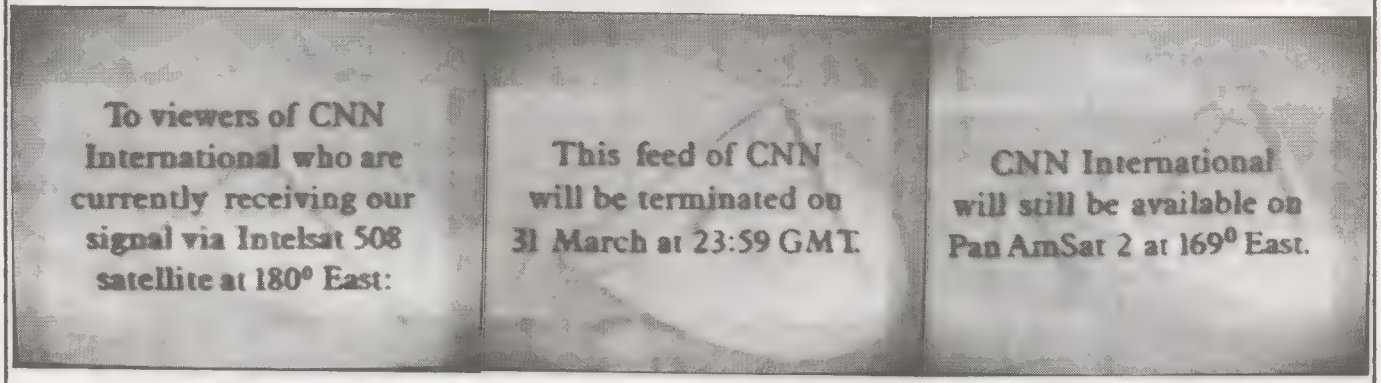
Satellites east of due north will align before noon, one directly north would align at 12 noon, those to west of north in the afternoon (the further west, the later in the day). Normal reception gradually degrades as if getting weaker, drops out at the point of maximum solar alignment, and then gradually returns to the original strength. A warning: An unpainted solid dish at this alignment can produce solar-heated temperatures past 1000 degrees C and this will quickly melt any cables and electronics unfortunate enough to be at the dish focal point! (Solar alignment data courtesy United States Information Service; thank-you David.)

General Instrument has announced their new "consumer friendly" DSR-2200 IRD for Digicipher reception and decoding. The US$1795 priced unit (model DSR-1500 is priced at US$2520; SF#6 and 7) has DTH features that include:

- Non-technical person 'set up'
- Remodulator (band I)
- Polarisation rotation servo motor interfacing

GI DSR-2200 Consumer IRD

R.I.P.: CNN CLOSES DOWN INTELSAT 180E TRANSMISSION



Turner International closed down their long available 3845 MHz analogue free to air transmission on I180E at 2359UTC March 31. The close down, first announced last September with a then-target date of 1 March, was preceded by increasingly frequent viewer announcements (see photos above) that began March 22. There are no real 'losers' here as PAS-2 reaches all 22 island countries of the South Pacific with as good, or a better, signal than the western hemispheric beam of I180E (see SF#3, p.'s 13-15). However, with CNN's half-transponder format reduced power on PAS-2, some eastern South Pacific locations remain as marginal with PAS-2 as they were with 180E.

UPDATE: PAS-2 At Publishing Deadline

Asia Business News has joined CCTV and CTN on the Hong Kong S/A format MPEG1+ uplink on TR2H (1426 MHz IF). Japanese NHK is now operational up to 14 hours per day with programming, the rest with test card on TR12H; portions of this feed are used for material sent to Asia Business News. CBS analogue feeds (TR16H) are gone, believed to now be on TR1V in S/A digital along with CMT. Prime feeds to Australia Galaxy on TR9V (1156 MHz IF) are reported to be in S/A format but not verified. Open analogue (PAS-2 Sylmar) continues on TR7V and on occasions TR6H. CNNI has settled to a level that is 5dB lower than pre-half-transponder format.

- Infrared remote control
- On screen display (OSD) menu, full stereo

The present version is Digicipher 1 (MPEG 1+) but a to-be-available consumer-plug-in MPEG upgrade card will update the unit to MPEG 2. Unfortunately, this is a Digicipher (digital) only receiver and will not process analogue signals; Maser Technology (64-9-479-7889).

French language Thomson format MPEG 1+ digital format Canal Plus now on I180E; a pair of Thomson MPEG channels also run on I174E for programme exchange (New Caledonia, Tahiti, Paris).

Next "up" to keep a watch on is Gorizont 140E or 145E where APNA ("Our TV") is scheduled to begin tests 15 April; possibly TR R6 (3675 MHz; IF 1475). In Australia, you should find the same APNA feed on Statsionar 21 (103E). Initially to be 6 hours daily, by mid-May they claim 10 hours daily in Hindi, Gujarati, and Punjabi, and 4 hours in Tamil, Telugu and Bengali. Programming to include movies, soaps, musical variety, quiz shows, documentaries and news. Russian sources claim the 140E bird will be replaced with a newer model "at any time" so the initial signal (and significant inclined orbit) could get better in the near term. A full programme schedule in #9.

EMTV IS HERE: Programme Schedule Highlights

Rimsat G2 (142.5E) is now relaying commercial English language television service EMTV on transponder R10 (3885 MHz; IF 1265). The service parallels the previously available Palapa EMTV service (118E, 3890V) but with the added coverage of Rimsat (see page 5, this issue) greatly enlarges the reach of this Australian Channel 9 operated service.

Their present basic schedule looks like that shown here (from last week in March / first week in April). Times are believed to be AEST (same as Sydney).

DAYTIME: Monday - Friday

6AM	ITN News
6:30AM	Daybreak News
7AM	Today Show
9:12AM	Close down
2:47PM	Open
3PM	Sesame Street
4PM	Ghostbusters
5PM	Wonder World
5:30PM	Home & Away
6PM	EMTV News
6:30PM	Current Affair
7PM	Sale of Century
7:30PM	Neighbours

	Monday	Tuesday	Wednesday	Thursday	Friday
8PM	Fish International	Wild Life	Mekim Music	Fizz (Music)	Australia's Home Video
8:30PM	Burkes Back Yard				Friday Night Football
9PM		Different Strokes	Wednesday Movie	The Footy Show	
9:30PM	Man From Snowy River	Hey Dad			
10PM		Young Doctors		Rescue 911	
10:30PM	Young Doctors	Hawaii 5-0	Country Practice	Country Practice	
11PM					Raven
11:30PM	6PM News replay	6PM News replay	6PM News replay	6PM News replay	
12mid					6PM News Replay

SATURDAY SCHEDULE

12noon	Wide World Sports
5PM	Beyond 2000
6PM	EMTV News
6:30PM	HEY HEY It's Saturday
8:30PM	Nodo News
9PM	World Championship Wrestling
10PM	Gillette Sports
10:30pm	Married With Children
11PM	Love & War
11:30PM	News replay

EMTV
PAPUA NEW GUINEA
THE NATIONAL TELEVISION SERVICE

Programme schedule courtesy Steffen Holzt (Studio 7, New Caledonia) and EMTV Papua New Guinea (Fax: 675-254450)

SUNDAY SCHEDULE

7AM	Chit Chat
8AM	Business Sunday
9AM	SUNDAY
11AM	Wide World Sports
4PM	Sports Sunday
6PM	EMTV News
6:30PM	Sunday Football
7:30PM	60 Minutes
8:30PM	Sing With Joy
9PM	Sunday Movie
10:45pm	Chit Chat
11PM	News replay

SatFACTS PACIFIC OCEAN ORBIT WATCH: 15 APRIL 1995

TR#	IF freq
R6/-1	1,475
1	1,430
R7	1,425
1 - 2	1,420
3	1,385
R8	1,375
3 - 4	1,360
R9	1,325
6	1,310
6A	1,305
5 - 6	1,300
R10	1,275
10	1,256
7 - 8	1,235
R11	1,225
12	1,220
14	1,175
9 - 10	1,170
16	1,135
11 - 12	1,110
18	1,105
13 - 14	1,050
22	1,015
15 - 16	985
23	984
23A	973
24	962

Gz/103	G1:130	Gz/140	G2:142.5	Gz/145	P169:Vt	P169:Hz	I174/177	I/180	Pattern
DubITV	RAJ TV	APNA?	ATN	DubITV					
								IDB	w/29
Muslim	Sun:T	DubITV	JJAY						
					CMT,CBS/d	CTN//CCT/ ABN/d			
								Vdp	w/28
	ABC-5		(MCPC)						
					NTU/d	Discov/b			
	AsNET		Eagle:T						
								KDD	w/29
					ESPN/b	OccVid			
JainTV	Gemini		EMTV	DubITV				Vdp	w/26
								Vdp	w/26
					PAS-2	Tests			
	Money		Udaya:K						
								Vdp	w/26
								Wnt	w/29
					Prime/d	CNN	←Cartoon		
								NHK	w/25
						NHK			
								RFO	G/29
					ANBC	TFC/d			
								A9	G/25
						OccVid			
							NwsFds	NZ/d	G/22
							(Afrts/b)		
							NwsFds	TVNZ	G/22

APRIL 1995 NOTES:
/d is digital, /b B-MAC encryption.
ANBC (underlined) is free to air /FTA.
Vdp is Vidiplexed analogue, typically FTA but requiring Vidiplex unit.
I180 patterns are: w/26 = western hemispheric, 26 dBw; G/22 = Global, 22 dBw (typically right hand circular).
RIMSATS left hand circular.
C-band receiver IFs assume normal LNB 'LO' of 5150 MHz; Ku IFs 11,300

EMTV = usable 3m < dish

ESPN/b = subscription available

Ku BAND ACTIVITY UPDATE

A3B1TR	IF Freq
1(V)	977
5L(V)	1,193
5U(V)	1,218.8
7L(V)	1,344
7U(V)	1,370
10(H)	1,073
11(H)	1,137

Optus A3/156E	Optus B1/160E
	TAB radio, data
ETV:>0000UTC	Occ.VideoNews
	Occ.Video
NHK:>1200UTC	ABC National
	SBS National
	Galaxy Digital
	Galaxy Digital

PAS2	IF Freq	Services/Users Reported
1K(H)	980nom	
2K(V)	980nom	
5K(H)	1100nm	
6K(V)	1100nm	Tests, special video feeds
9K(H)	1230nm	
10K(V)	1230nm	
13K(H)	1350nm	
14K(V)	1350nm	Tests, special video feeds

For PAS-2 Update, see p. 22.

Ku band data courtesy Robin Colquhoun (64-9-630-7127), Francis Kosmalski (64-9-849-3512), others. Galaxy digital (B1) is NTSC, GI Digicipher 1.5.

SatFACTS APRIL 1995 POR OBSERVER REPORTING FORM
(Please FAX [64-9-406-1083] or mail to arrive by 03 May)

TELL US what you are seeing, or using for equipment, that is new within the last 30 days. Observer reports (see "With The Observers" page 20) form an important part of the growing body of information we all share monthly.

• NEW programming sources seen since 1 April: (Please list receiver 'IF' or satellite transponder number if known) _____

_____

_____

• CHANGES in reception quality since 1 April: _____

_____

_____

• EQUIPMENT changes at my observing terminal since 1 April: _____

_____

_____

■ My Name _____ Address _____

Town / City _____ _____ Country _____ **(Please turn form over)**

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COMPANY (if applies) _____

ADDRESS _____

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☐ **TB9402 / MATV** (NZ$20 world-wide).
☐ **TB9404 / Home Satellite** (NZ$20 world-wide).
☐ **TB9405 / Commercial Satellite** (NZ$20 world-wide).
☐ ALL THREE / TB9402, 9404, 9405 (NZ$40 world-wide)
☐ **Coop's Satellite Operations** (NZ$30 world-wide).
☐ **Gibson Navigator** (NZ$30 world-wide).
☐ **Coop's Basic - Fine Tuning** (NZ$30 world-wide).
☐ ALL THREE / OPERATIONS, NAVIGATOR, BASIC (NZ$70 world-wide).
☐ **CTD 9412 / StarNET Wants To Put You in Cable TV** (NZ$30 world-wide)
☐ **CTD 9502 / The MDS Puzzle** (NZ$30 world-wide)
☐ **CTD 9503 / Copyright As It Applies to Satellite Reception** (NZ$30)

Instructions:
☑ Check off items you wish airmailed to you
■ Make cheque to Far North Cablevision Ltd.
■ Complete reverse side of card

■ YOUR equipment survey:
Size dish(es): _____; Noise Temp LNB(s): _____
Make/model receiver(s): _____
Make/model standards conversion: _____

■ Friends with dishes (Will be sent literature explaining SPACE):

_____
_____
_____
_____
_____
_____

If mailing, to: SatFACTS Observers, PO Box 330, Mangonui, Far North, New Zealand

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or,

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☐ Check here and complete your information below if you wish SPACE Pacific membership information but are not subscribing to SatFACTS Monthly.

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NAME _____
Address _____
Town / City _____

Return to:
SPACE Pacific, PO Box 330, Mangonui, Far North, New Zealand

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○ Complete your own ship-to information below.

Total amount of order (add items ordered on reverse side of this card): NZ$_____
(If paying in US$, multiply .62 times NZ$ number for total)

Ship to:

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Address _____

Town / City _____ _____ Country _____

-SatFACTS DATA SHOPPE-

YOUR Source For Reference, Study Materials In The World Of Satellite TV

ENTRY LEVEL:

☐ **The WORLD of SATELLITE TV** (Asia Pacific edition) by Mark Long and Jeffrey Keating. The ideal "starter" manual for someone entering the field of satellite television. How the system works, what the parts do, how they all fit together. 226 high quality, well illustrated pages. Ease of comprehension plus excellent detail. Price: NZ$30 within NZ, NZ$35 elsewhere. Note: Limited copies remain in stock, these will surely sell out this month!

☐ TB9402 / **MATV: Master Antenna Television Systems**. How to plan, select equipment for and install multiple outlet systems for motels, hotels, apartment flats and condos. Practical step by step guidance. Price: NZ$20 world-wide.

☐ TB9404 /**Home Satellite Systems**. What the parts are, how they go together for POR home TVRO systems; how you create a working system with maximum performance at minimum outlay. Price: NZ$20 world-wide.

☐ TB9405 / **Commercial Satellite Dish Systems** (SMATV). If you are building a system from scratch, also order TB9402 for the MATV portion basics. If you are rebuilding an existing MATV system to add satellite signals, you need this! Price: NZ$20 world-wide.

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☐ **Coop's Satellite Operations Manual**. Originally written 1980, this manual explains how you locate and interpret the multitude of wide and narrow band signals available via satellite. Dozens of fun, new ways to get more from your dish system. Price: $NZ30 world-wide.

☐ **Gibson Satellite Navigator** (O/w 1980). The mechanics of the Clarke Orbit Belt, how a dish tracking system is designed and operated to allow full horizon to horizon reception with a motorised dish system. Very practical, very hands on with plenty of do-it-yourself instruction for inexpensive systems. Price: NZ$30 world-wide.

☐ **Coop's Basic Manual on Fine Tuning Satellite Terminals** (O/w 1980). The little things such as feeds, connectors, powering. Tips from the people who started home dish reception in the 1970s, building the foundation for the present TVRO industry day by day, discovery by discovery. Very practical, very hands on. Price: $NZ30 world-wide.

■ ALL 3 (Two from Coop, one Gibson) as a package for NZ$70 (you save $20).

BUSINESS MANAGEMENT REFERENCE MATERIAL:

☐ **CTD 9412 / StarNET TV Wants To Put You In The Cable TV Business.** When AsiaSat 2 is launched in mid year, StarNET's 7 free to air (plus 35 pay TV) services are designed to make you a cable TV operator. Price: $NZ30 world-wide.

☐ **CTD 9502 / THE MDS PUZZLE.** New Zealand Telecom is entering the home entertainment business using MDS as a delivery vehicle. How it works, the business challenges. Price: $NZ30 world-wide.

☐ **CTD 9503 / COPYRIGHT - How It Works, Your Liabilities.** Must reading for anyone planning to distribute satellite programming to motels, hotels, communities. Price: $NZ30 world-wide.

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